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Abstract

In this paper we extend the work of several authors on the 'Telephone Coordination Game' originally proposed as follows by the first author: In each of two rooms, there are n telephones randomly strewn about. The phones are connected pairwise in some unknown fashion. There is a player in each room. In each period $0, 1, 2, \ldots$, each player picks up a phone and says 'hello', until the first period when they hear each other (called a meeting). The common aim of the two players is to minimize the (expected) number of periods T required to meet. The players do not have any common labeling of the telephones on which they can coordinate. This problem is a paradigm of coordination without communication. The problem has led to a number of papers, some based on modifications of the original version, but (for $n > 2$) the original Telephone Problem remains open. The main results of this paper show that the optimal AW strategies for $n = 3$ and 4 have additional optimality properties with respect to a wider class of Markov strategies.

Abstract

This paper deals with the Shapley-Shubik, Banzhaf and nonsymmetric Shapley-Owen indices of power and their application to the House of Councilors in Japan.

Abstract

The paper studies employer-employee relationships under information asymmetry in a form of a contract. An employer hires an employee to perform a task. The wage of employee is the difference between his compensation level and a dis-utility of efforts required to achieve the outcome, and this difference depends on the activity of employee measured in terms of money. In case if all the parameters of model are common knowledge, equilibrium is found. However, even assuming that only some of parameters are known precisely to the employer, it is also possible to derive an equilibrium point. A sensitivity analysis of equilibrium is provided.

Abstract

A new way to analyze competitive economic situations has been introduced. This analysis is based on considering these problems as bicriteria games. This paper shows the use of these games as a tool for the analysis of economic situations, that sheds light in market competition when more than one objective or scenario must be considered. The concept of Pareto-optimal security strategy applied assures the property of security in the individual criteria against opponent's deviation in strategy, i.e., the security levels associated to these strategies cannot be improved componentwise. Other solution concept considered in the paper is the G-goal security strategy, which includes as part of the solution the probability of obtaining prespecified values in payoff functions. Thus, this concept permits the players to measure their attitude toward risk and a strategy will be chosen taken into account the probability to achieve the different payoffs.

Abstract

Sakaguchi (1995) suggested to consider the following two-person non-zero-sum optimal stopping game being a simple model of bargaining process. The game consists of at most n steps. Each of two players (I and II) draws a number (x and y respectively) according to uniform distribution on $[0, 1]$. Player I(II) knows his hand $x(y)$ only, and does not know his opponent's hand. After observing his number each player can then choose, simultaneously and independently of opponent's choice, either to accept (A) his number or to reject (R) it. If the players' choice-pair is A-A then the payoff to player I(II) is $x(y)$ and the game is over. If the players' choice-pair is R-R, then the current sample (x, y) is rejected, the game passes on to the next step where each of two players (I and II) draws a number (x and y respectively) according to uniform distribution on $[0, 1]$ independent of previous step and again makes his choice. If the players' choice-pair is A-R or R-A then a lottery is used to the effect that either A-A or R-R is enforced to the players with probability p or $\bar{p}$, where $p \in [0, 1], \bar{p} = 1 - p$. Every player is to maximize his expected payoff. The aim of the present paper is to investigate influence of some additional information which can be obtain by player about his opponent's number in a Sakaguchi-type game.

Dixon (1993) suggested to consider the following n person game. Player i receives a Poisson stream rate q_i of independent identically distributed (i.i.d.) $U[0, 1]$ offers (say, called cakes of different size). Rejected offers are repeatedly passed on according to an irreducible transition matrix P until either someone accepts the offer or everyone has seen it, in which case it discarded. It is assumed that this process is instantaneous so that there is no delay between the arrival of an offer and its acceptance by some player or rejection by all. Also, if a player has rejected an offer, he may not then accept it if it is presented to him again while it is doing the rounds. This continues until either (i) the time limit expires or (ii) some player accepts an offer. In case (i) no player earns any reward, otherwise the player (say, player i) who

has accepted an offered cake of size x receives $\bar{\alpha}_i x$ part of the cake via a contribution of $\alpha_j x$ from each other player j, where $\alpha_i \geq 0, i \in [1, n], \sum_{i=1}^{n} \alpha_i = 1$. The aim of the present paper is to consider two modifications of this Dixon's game for two players. A remarkable feature contained in this work is that in the first model where players perform their choice consequently they do not bluff in their optimal behavior, in the meantime simultaneous choice in the second model makes them bluff what makes this work different from earlier works on games on the Poisson processes (Enns and Ferenstein (1989), Ravindran and Enns (1992), and Sakaguchi (1991)).

Abstract

The paper identifies the strategic effects of learning-by-doing in presence of unintended spillovers of production experience. In a two-stage game an incumbent and an entrant each produce a homogeneous good. Through his production in the first period, the incumbent gains experience which reduces the period-two unit cost. A fraction of this experience is spilled over to the entrant, and reduces the entrant's unit cost of production. In contrast to previous studies, we suppose that only one firm is in the market during the first stage and learning is not necessarily symmetric.

Abstract

This paper deals with a class of cooperative games called bin packing games. We show that the problem for checking emptiness of the core of a bin packing game is NP-complete. We propose a pseudo polynomial time algorithm for finding an allocation in ϵ^*-core of bin packing games.

Abstract

We consider three-person cooperative game under uncertainty and without side payments

$$\Gamma = \langle \{1, 2, 3\}, \{X_i\}_{i=1,2,3}, Y, \{f_i(x, y)\}_{i=1,2,3} \rangle.$$

The game proceeds in the following manner. Each player i chooses his strategy $x_i \in X_i \subseteq \mathbf{R}^{n_i}$ $(i = 1, 2, 3)$; as a result, the situation $x = (x_1, x_2, x_3) \in X_1 \times X_2 \times X_3 = X \subseteq \mathbf{R}^n$ $(n = n_1 + n_2 + n_3)$ is formed; the payoff function $f_i(x, y)$ of player i $(i = 1, 2, 3)$ is determined by pairs $(x, y) \in X \times Y$. The goal of each player is to choose a strategy so as to obtain the largest possible payoff (the value of his payoff function on pair $(x, y) \in X \times Y$). Here the players must be aware of the fact that any unpredictable uncertainty $y \in Y$ can be realizable in advance.

In this paper we discuss the notion of imputation, which is based on the principle of the guaranteed result in the game Γ and we also take into account the cooperative nature of the game.

Abstract

In this paper the partial cooperative games (PCG) in extensive form are considered. The main peculiarity of PCG is that the behavior of each player is a combination of cooperative and individual behaviors. A construction method of the optimal game trajectory is proposed.

Abstract

In this paper a conflict between a potential criminal offender and a law- enforcement authorities is investigated. Continueing the previous work [10] the model we study is a non-zero-sum two-period game under incomplete information, where each player doesn't know whether the opponent is unable to act, or can act at most two times during the two periods. We study the game in the Bayesian approach and derive Bayesian equilibria of three one-period games and one two-period game under various information structures, each in an explicit form depending on the parameter values of the game. It is shown that, just as our common sense suggests, the equilibrium goes to "act-act" choice-pair, (i.e. criminal commits crime, when police places an alert against him) as offender's illeagal income, comming from an unpunished crime, increases. Also we give a numerical example which corroborates the theoretical analysis.

Abstract

In this work the sufficient conditions of existence of Slater-guaranteed imputation are obtained in the cooperative linear-quadratic game of three persons without side payments in which actions of disturbances, noise or other uncertainties are recognized. Ways of a formalization of solutions of games under uncertainty are used from [Zhukovskiy, 1996, Zhukovskiy, Chikrii, 1994].

Abstract

The main result of paper is the theorem about the existence of equilibrium in a non-cooperative game under uncertainty. It is important that in a definition of the game, payoff to a player depends not only on a strategy profile formed by all players, but also depends on an uncertainty with values from the given set. For this type of game an equilibrium concept, called the NH-solution, is introduced. It coincides with Nash equilibrium in a game with special payoff functions without uncertainties constructed in accordance with the Hurwitzs principle. Under some conditions, the existence of a NH-solution in mixed strategies is proved.

Abstract

This paper considers a class of games which is suggested from the competition of production development in manufacturing and the logic of animal conflict. There are n players, Player $1, \cdots, n\,(n \geq 2)$, complete to obtain a territory for the existence. Each of them has to select a stopping time of his investing time and energy to occupy the territory. The winner is the one who keeps the investing for the longest time among the n players, and he can monopolize the territory immediately he occupies it. The territory has the value $v(t)$ depending on time $t \in [0, \infty)$. Therefore, once a player monopolize the territory at time $x \in [0, \infty)$, he can get all values $V(x)$ possessed by the territory after that time, i.e., $V(x) = \int_x^\infty v(t)dt$. While, the losers are players who give up to invest earlier, and he can not get anything. However, each of the n players has to spend the cumulative cost $H(x)$ if he intends to invest time and energy until time $x \in [0, \infty)$. As well as in games of timing, we introduce two patterns of information available to the players, i.e., silent version and noisy version, here. We derive an optimal strategy, i.e., an optimal stopping plan based on the information structure, from a view point of Nash equilibrium, since the model yields us a certain class of n-person non-zero sum infinite games on $[0, \infty) \times \cdots \times [0, \infty)$.

Abstract

In this paper new demand operations in minimum spanning tree games are proposed. Any allocation obtained through a demand operation by a coalition on a Bird tree allocation is an element of the core of the minimum spanning tree game. However, some of the obtained allocations still do not belong to the core of the monotonic cover game. Hence, a revised weak demand operation is proposed. Any allocation obtained through the revised operation on a Bird tree allocation is an element of both the cores of the minimum spanning tree game and the monotonic cover game. Therefore, every obtained allocation has no negative element, and hence the revised weak demand operation is more applicable than the original one.

Abstract

Epp and Ferguson obtained a solution to take-away games. Such game is determined by a natural number M and a nondecreasing function $f(n)$. In the beginning the first player can remove from a pile any positive number of counters k which is not greater than M. On the next move the second player can remove from a pile any positive number of counter k' which is not greater than $f(k)$, etc. The player removing the last counter becomes a winner. In the present paper we consider similar games with a constant lower restriction.

Abstract

The paper deals with a dynamic game of extraction of common renewable resources by players constituting a nonatomic measure space. the general model applies both to the continuous and discrete time.

The questions of the existence and properties of equilibria are considered. Another issue is a tax-subsidy system, with socially acceptable properties, enforcing an equilibrium which is Pareto optimal and at least as good as the one arising after introduction of private property.

Abstract

This paper addresses the problem of finding the Nash equilibrium in a Game Statement of Carnot Duopoly. In the model there are two firms. Both firms produce the same type of a good, however in a different quantity, which accounts for x and y units. The Nash Equilibrium is found for the static model of Carnot duopoly as well as for the differential game in a continuous case, when x and y are changing continuously over time.